



**Alamo River Silt/Sediment TMDL**



**Workshop**  
**Staff Report**  
**May 24, 2001**



California Regional Water Quality Control Board  
Colorado River Basin

## Topics

- 1 Background
- 2 Silt/Sediment TMDL
- 3 Implementation Plan
- 4 Compliance, Assurance, Enforcement
- 5 Basin Plan Amendment

## **Legal Reasons**

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- Federal Pollution Control Act (CWA)
- Porter-Cologne
- Basin Plan
- State commitment to legislature

## **What Does CWA Require?**

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- CWA 303(d)
  - Identify impaired waters
  - Establish priority list of impaired waters
  - Develop TMDLs for impaired waterbodies
  - USEPA must develop TMDLs if State fails to act

## State Requirements, Initiatives

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- California Water Code
  - Protect and restore water quality
- Basin Plan
  - Establishes water quality standards and procedures to enforce the standards
- CalEPA Strategic Vision
  - TMDLs for Border area
- Legislature expects TMDLs

## Why the Silt/Sediment TMDL?

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# What are TMDLs?

**Assimilative Capacity of a Waterbody =**



Allowable  
Pollution from  
point sources

+



Allowable  
Pollution from  
nonpoint sources

+



Pollution from  
Natural Sources  
(wind, runoff, etc.)

+

**MOS**

Margin of  
Safety  
(uncertainty)

**“Pollution Budget”**

**Setting**

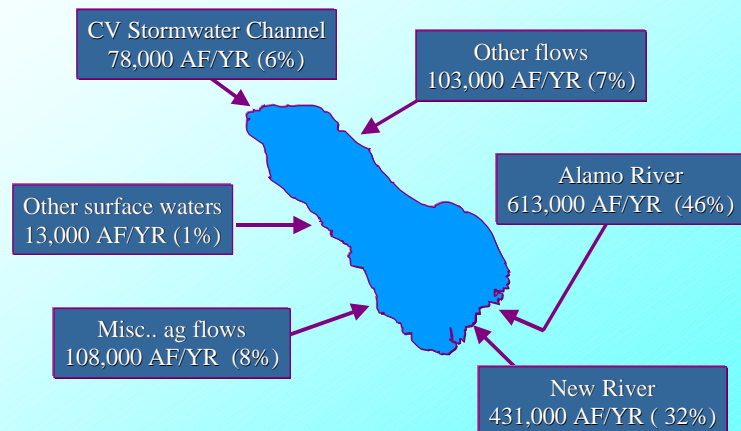
## Salton Sea Watershed



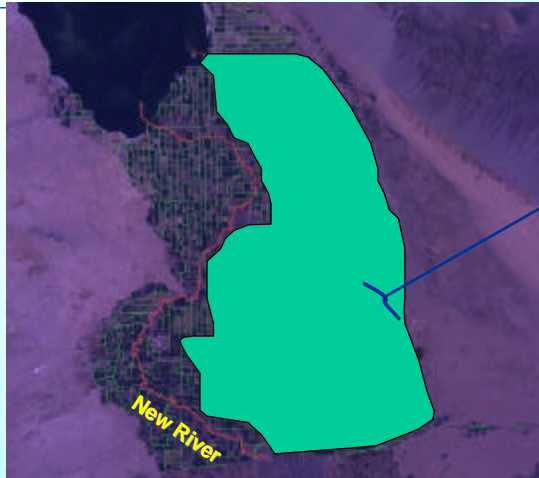
### Priority watershed

- Over 8,000 sq. miles
- Watershed impaired
- NPS greatest TTWQ
- Transboundary issues
- Important habitat
- Migratory birds, pupfish
- Closed basin

## Salton Sea Inflows (approx.)



## Alamo River Subwatershed



### Subwatershed Size

- 340,000 acres

### Tributary Drains

- 5 major drains
- 71 minor drains

### Developed Areas

< 1% of County Area

### Drainage into Sea

650,000 ACF/YR

## Nature of Flows in Alamo River



- Operational Spills
- Seepage
- Tilewater
- Tailwater

## Salton Sea Avian Diversity

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- Over 350 avian species
- Some sensitive avian species
  - Yuma clapper rail
  - California black rail
  - Southwestern willow flycatcher
  - Brown pelican
  - Burrowing owl

## Salton Sea Fish Diversity

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- Desert pupfish
  - Inhabits drainages, near shore pools
- Salton Sea saline environment



## Sensitive Species in Watershed

<u>Common Name</u>	<u>Status</u>
■ Desert pupfish	SES/FE
■ California brown pelican	SES/FE
■ Southwestern willow flycatcher	SES/FE
■ California least tern	SES/FE
■ Least Bell's vireo	SES/FE
■ Greater sandhill crane	FT
■ Yuma clapper rail	STS-FP/FE
■ Southwestern willow flycatcher	SES/FE
■ Tri-colored blackbird	SSSC
■ Burrowing owl	SSSC

## Sensitive Species (cont.)

<u>Common Name</u>	<u>Status</u>
■ Least bittern	FSSC
■ Loggerhead shrike	FSSC
■ Yellow warbler	FSSC
■ Van Rossem's gull-billed tern	SSSC
■ Caspian tern	SSSC
■ Black skimmer	SSSC
■ California black rail	STS-FP
■ Cooper's hawk	SSSC
■ Sharp-shinned hawk	SSSC
■ Short-eared owl	SSSC
■ Long-eared owl	SSSC



## Alamo River Bio Diversity

- Freshwater and brackish water species
  - Carp
  - Longjaw mudsucker
  - Red shiner
  - Sailfin mollie
  - Large mouth bass
  - Catfish
  - Tilapia.
- Food source for avian and mammal species

## Beneficial Uses



- WARM
- WILD
- REC I, II
- RARE
- FRSH



## Silt/Sediment TMDL

### TMDL Components

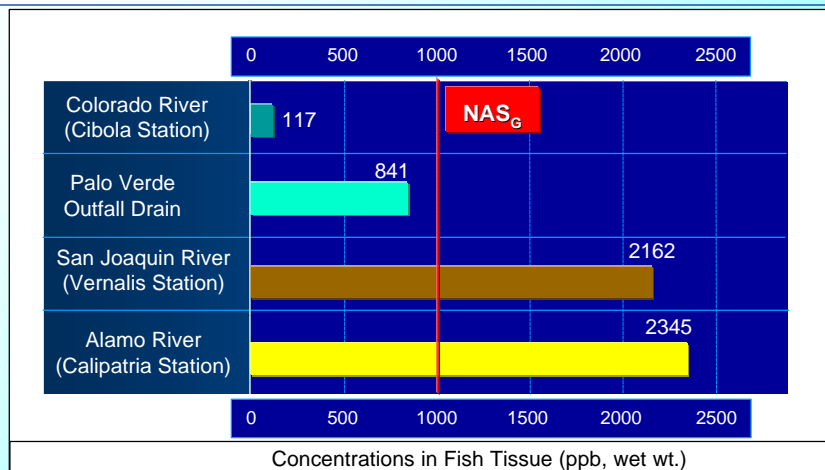
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- What's the problem?
- What's causing the problem?
- What numeric standard addresses the problem?
- What's the allowable pollutant load under the standard?
- What is the link between the standard and loads?

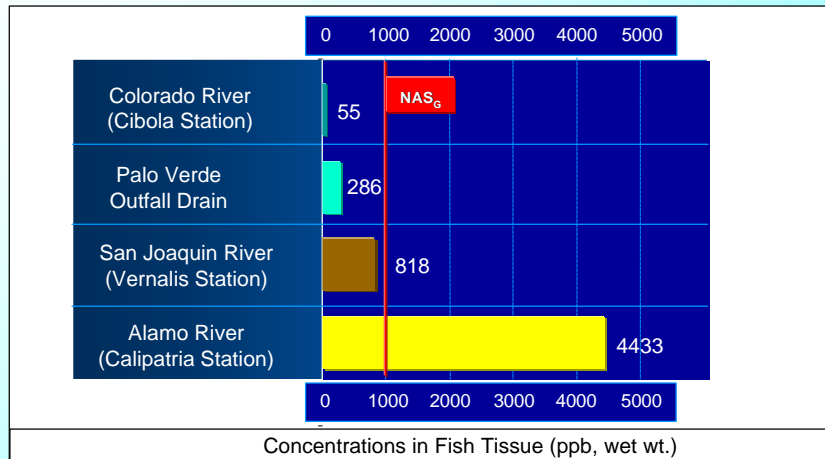
## Silt/Sediment Impairments

- Transport insoluble pesticides
  - DDT, DDT metabolites, toxaphene
- Impair aquatic habitat
  - Water column and bottom deposits
- Transport nutrients
  - Nitrogen and phosphorous
- Violate water quality objectives
  - Turbidity, sediment, suspended solids

## Total DDT (Channel Catfish)



## Total DDT (Carp)



## Total DDT in Fish Tissue (Alamo River)

Species	Percent Exceeding		Highest conc. (ppb-ww)
	NAS <sub>guideline</sub>	FDA <sub>AL</sub>	
Carp	92	33	9,153
Catfish	67	0.8	5,300

***In General :***

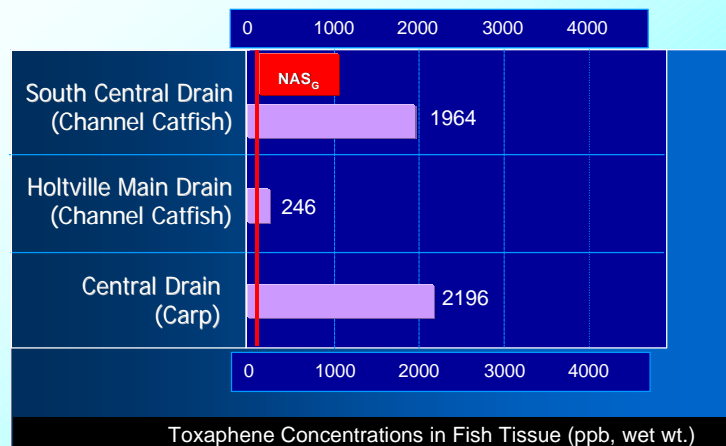
***78% exceed NAS, and 26% exceeds FDA***

## Toxaphene in Fish Tissue (Alamo River)

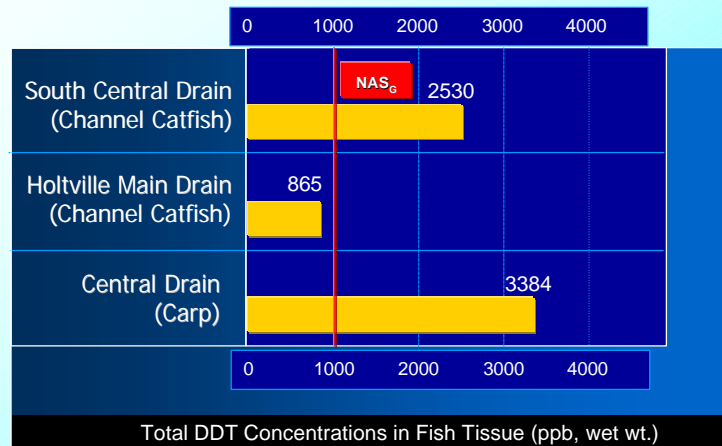
Species	% of Samples Exceeding $NAS_G$	Highest conc. (ppb-ww)
Cat Fish	83	2,200
Carp	67	1,100

$NAS_G = 100 \text{ ppb-ww}$

## Toxaphene in Fish from Drains



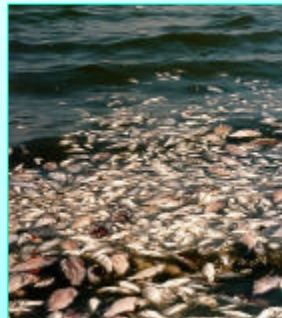
## Total DDT in Fish from Drains



## Sediment and Nutrient Transport

### Sea's eutrophic condition

- 40% of nitrogen is from Alamo River
- 20% of phosphorous is from Alamo River



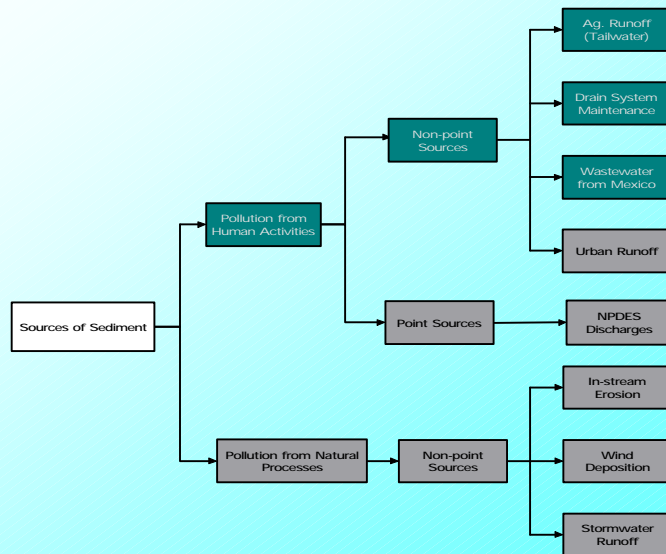
## Impairments

	Silt/Sediment Impairments
Wildlife habitat	✓
Warm water fishery	✓
Recreation (I and II)	✓
Rare/endangered species	✓

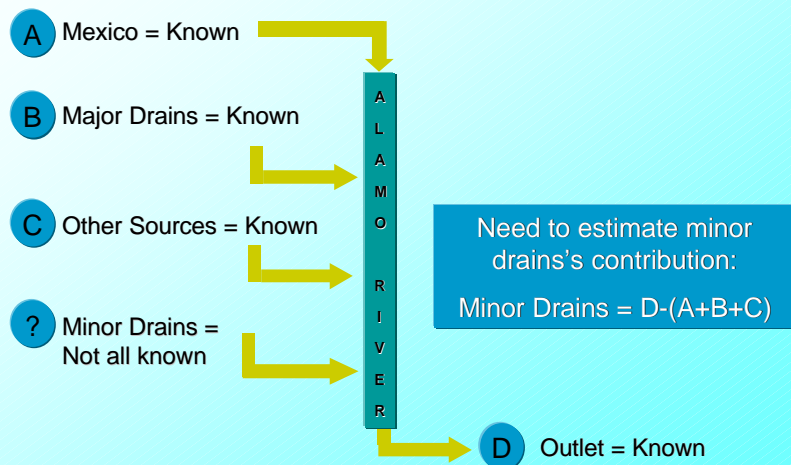
## Sources of Impairments



## Sources of Silt/Sediment



## Source Analysis Estimate



## International Boundary



■ One Source

146 tons/yr

## Natural Sources



- In-Stream Erosion
- Wind Deposition
- Stormwater Runoff

6500 tons/yr

## Drainage O&M



Dredging

## Tailwater Erosion



Unplanted Fields

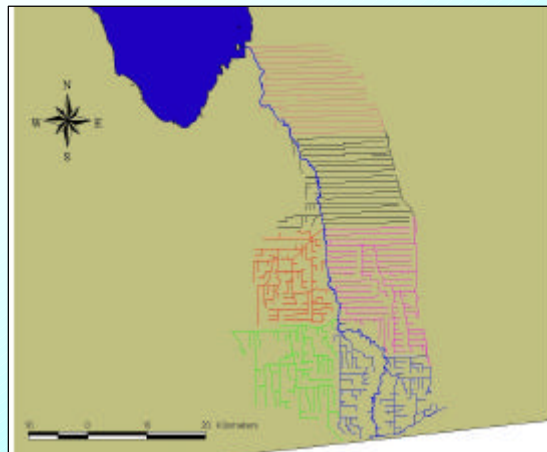


## Tailwater Erosion



Cropped  
Fields

## Drainage System for Ag Discharges



- 5 Major Drains
- 71 Minor Drains

## Alamo River Current Load



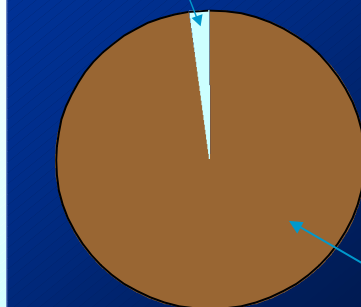
Border < 150 tons/yr



Outlet to Sea ~ 330,000 tons/yr

## Load Estimate Summary

Natural Sources, Mexico, Point sources < 2%



Drains ~ 98%



2-mile long convoy of  
trucks dumping 329,500  
tons of dirt  
@ Delta

## Numeric Target

## Numeric Target

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- Why?
  - Required by CWA Section 303(d)
  - Interprets narrative water quality objective
- Considerations?
  - Limitations of available data
  - Widespread use of DDT in Valley
  - Warmwater rivers typically carry more sediment
  - Effluent dominated river
  - Economics (Porter-Cologne)



## Numeric Target

### ■ Basis?

- Direct impacts of suspended solids on aquatic ecosystems
- USEPA criteria
- NAS (1972) criteria
  - High Level of Protection, TSS of 25 mg/l or less
  - Moderate Level of Protection TSS of 80 mg/l or less
  - Low Level of Protection, TSS of 400 mg/l or less
- EIFAC (1965)
  - "...The available studies suggest that the death rate of fish living in in waters that, over the long period, contain TSS in excess of 200 mg/l is likely to be substantially greater than it would have been in clean water..."

## Proposed Numeric Target

- Total suspended solids (TSS) = 200 mg/l
- Annual average
- Corresponding turbidity
- ~ 50% reduction in current concentrations
- Within the range of effectiveness of BMPs
- Higher than most existing WQOs in California
- Several years to reach target
- Refine target as appropriate



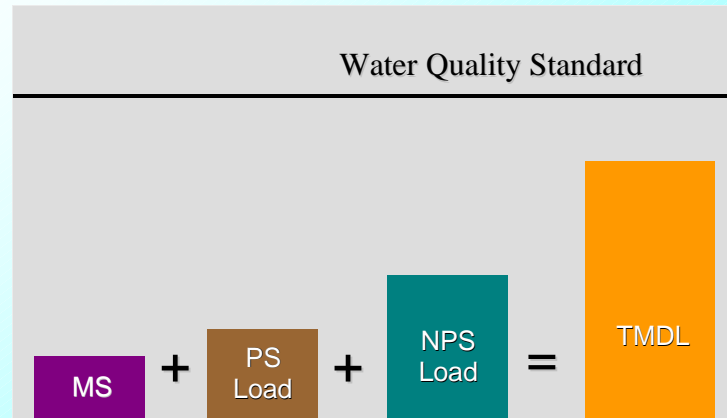
## Linkage & Allocations

### Linkage Analysis

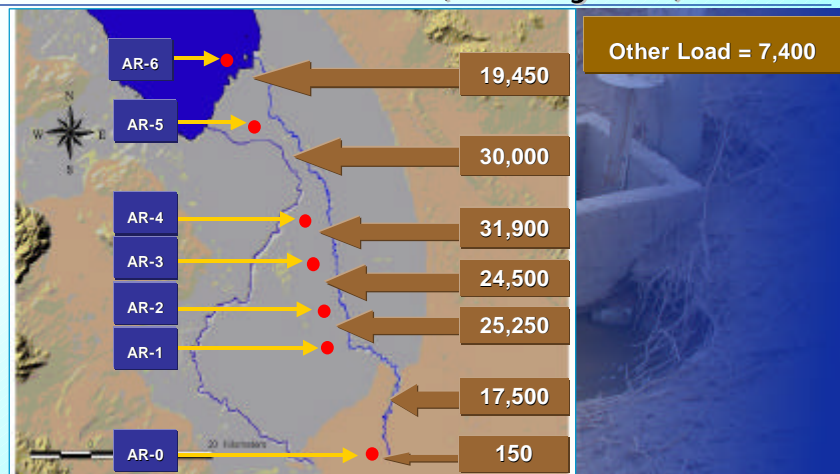
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- Link between Numeric Target and sources of sediment, basis for setting Load Allocations
- Shows how meeting Load Allocations will result in meeting the Numeric Target

## Allocation of Allowable Loads



## Load Allocations\* (tons/year)



\* Rounded up to nearest 50 tons/yr

## Load Allocations

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- Annual load allocations (tons/year)
- Six segments + International Boundary
- Load allocations based on drain flows, Numeric Target

**Implementation  
and  
Basin Plan Amendment**

## Requirements for Adopting TMDL

- Established via Basin Planning process (CWC §13241)
- Must be peer reviewed (HSC §57004)
- Must include an implementation plan (CWC §13242)
- Process “functionally equivalent” under CEQA (14 CCR §15251)
- Other considerations (CWC §13141, §13241)

## Adoption of WQS

Requirement for Adoption of Standard	Status
Peer Review	Done
Implementation Plan <ul style="list-style-type: none"><li>■ Actions to be taken</li><li>■ Timeline for actions</li><li>■ Surveillance program</li></ul>	Included in proposed Amendment
Economic costs to agriculture and potential sources of financing	Included in TMDL Report
Environmental Review <ul style="list-style-type: none"><li>■ CEQA Checklist</li></ul>	Included in TMDL package

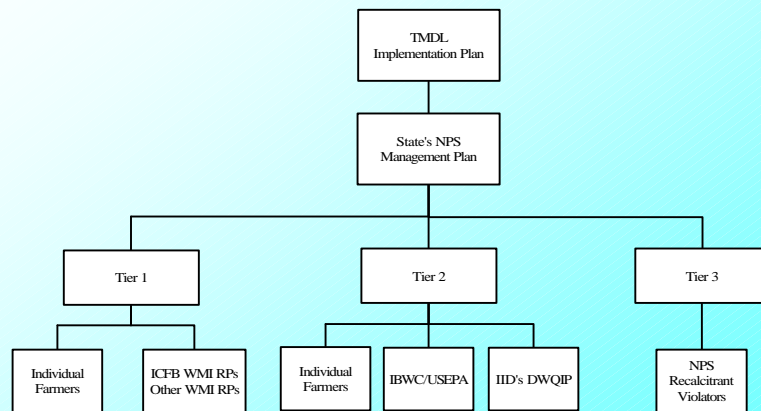
## Strategy for Implementation

- Phased approach
  - Four phases
- Implements State NPS Program
  - Three tiers
  - Provides for implementing ICFB initiative
- Compliance, assurance, enforcement

## TMDL Phases

Phase	Timeline	% Load Reduction	Interim Target (mg/L)
Phase I	2001-2003	15%	320
Phase II	2004-2007	25%	240
Phase III	2008-2010	10%	216
Phase IV	2011-2013	8%	200

## Tiered Approach



## Requirement of Farmers

- Submit Water Quality Management Plans
  - Identify problems
  - Identify self-determined BMPs
  - Identify timeline for implementation of BMPs
  - Document implementation and water quality
  - Report activities

## Requirement of IID

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- Submit revised DWQIP
- Monitor drain water quality
- Implement BMPs to comply with TMDL for drainage maintenance

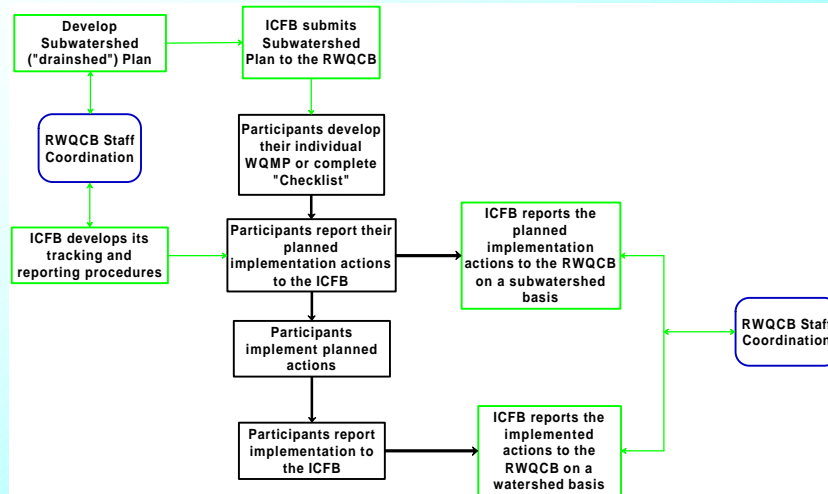
## Requirement of US Government

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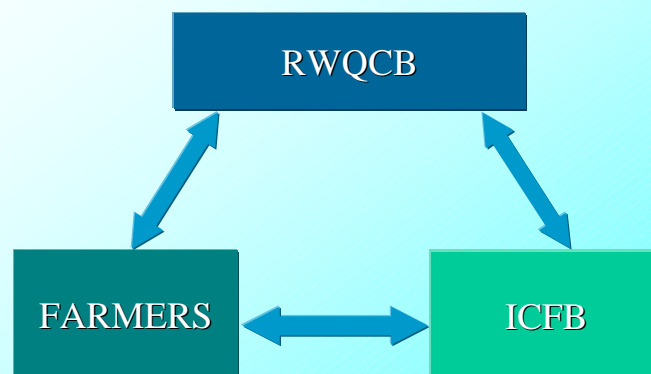
- Submit plan to ensure compliance at Boundary



## ICFB Voluntary Watershed Program



## Reporting Options



## Recommendation for ICFB Plans

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- Inventory of resources
- Problem assessment
- Statement of goals
- Existing and/or alternative BMPs
- Timetable for implementation
- Monitoring
- Mechanism for reporting activities

## On-field and Off-field BMPs

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- TAC Recommended
- UCCE Recommended
- Others
  - Total of 16 BMPs available
- Listed BMPs not prescriptive

## Factors in choosing BMPs

- Technical considerations
  - Soil, crop, etc.
- Economic considerations
- Effectiveness

## Example of BMPs



VS



VS



## Example of BMPs

**Sprinkler Irrigation**



**C-Taps**



**Grassed ditch**



**"Speed bump"**



## Efficiency of Selected BMPs

BMP	SRE %
Channel Vegetation/Grassed Waterway	13-50
Drip Irrigation	60-95
Filter Strips	40-65
Irrigation Water Management	20-30
Land Leveling	10-50
Reduced Tillage	25-75
Sprinkler Irrigation	25-95
Tailwater Ditch Checks/ Check Dams	40-60

Source : Jones & Stokes Associates, 1996

## Compliance with TMDL

- Deal with recalcitrant dischargers
- Monitor Alamo River @ key places
- On-going data assessment
  - Milestones , water quality, BMP implementation
- Report to Board periodically
  - Quarterly reports
  - Comprehensive report every 3 years
- Random upstream monitoring

**Economics  
(CalEPA Staff)**

## **Farming Practices to Reduce Sediment Discharge**

**Land Erosion Depends On  
Water and Soil Characteristics**

### **Sediment Discharge Factors:**

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- **Velocity of Water Inflow**
- **Soil Type**
- **Crop**
- **Irrigation Methods**
- **Field Size (length of run)**
- **Down-slope and Side-slope**
- **Velocity of Water Runoff**
- **Drop Structure Characteristics**
- **Tailwater Ditch Characteristics**

## Feasible Management Practices

- Install Fibermat Filter Strips
- Construct Pan Drainage Ditches
- Construct Sediment Basins with Overflow Discharge
- Monitor the Irrigation Process

## Estimated Annual Costs/Acre

- Fibermat Lined Drainage Ditch: \$29.40
- Pan Drainage Ditch: \$ 6.15
- Sediment Pond: \$19.80
- Irrigation Labor – 50% increase
  - Field Crops \$5.00 to \$13.00
  - Vegetable and Row Crops \$30.00 to \$40.00



## CEQA Checklist

### CEQA

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- CEQA “Functionally Equivalent” Package
  - TMDL Report
    - Supporting documents
  - Basin Plan amendment
  - CEQA Checklist
  - CEQA Checklist discussion

## Projected BMPs

BMP	Factor		
	Cost	Effectiveness	Projected Local Acceptability
Maintain Drainage Structure (IID Reg. 39)	Required	Yes	Yes
Tailwater Box with Raised Grade Board	Yes	Yes	Yes
Improved Tailwater Box, widened weir, raised grade board	Yes	Yes	Yes
Pan Ditch	Yes	Yes	Yes
Tailwater ditch checks (check dams)	Yes	Yes	Yes

## Projected BMPs (cont.)

BMP	Factor		
	Cost	Effectiveness	Projected Local Acceptability
Irrigation water management	Yes	Yes	No
Field to tailwater ditch transition	Required	Yes	Yes
Furrow dikes (C-Taps)	Yes	Yes	Yes
Filter strips	Yes	Yes	Yes
Reduced tillage	Yes	No	Yes
Channel vegetation/grassed waterway	Yes	Yes	Yes

## Projected BMPs (cont.)

BMP	Factor		
	Cost	Effectiveness	Projected Local Acceptability
Irrigation canal lateral	Yes	Yes	Yes
Irrigation land leveling	No	Yes	Yes
Sedimentation basins	No	Yes	Yes
Sprinkler irrigation	No	Yes	Yes
Drip irrigation	No	Yes	Yes

## Discussion of Potential Impacts

- Agricultural Resources
- Air Quality
- Biological Resources
- Geology and Soils
- Hydrology and Water Quality
- Less than Significant Impact under Mandatory Findings of Significance

## Agricultural Resources

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- Less than Significant Impact
  - Conversion of farmland from BMPs

## Air Quality

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- Less than Significant Impact
  - Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
  - Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

## Biological Resources

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- Less than Significant with mitigation
  - Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, regulations, or by the California Dept. of Fish and Game or U.S. Fish and Wildlife Service.

## Biological Resources, cont.

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- Less than Significant Impact

Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Dept. of Fish and Game or U.S. Fish and Wildlife Service.
- Less than Significant Impact

Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Mitigation: Operational changes in dredging

## Geology and Soils

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- Less than Significant Impact
  - Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: earthquake, fault zoning map, seismic ground shaking, seismic ground failure, or landslides.

## Hydrology and Water Quality

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- Less than Significant with Mitigation
  - Violate any water quality standards or waste discharge requirements.

### **Mitigation: IID Monitoring Program**

- **Less than Significant Impact**
  - Otherwise substantially degrade water quality.

**Questions/Comments?**

**Response to TAC Delay  
Recommendation**

## **TAC Request**

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- Delay TMDL adoption until
  - Salton Sea project settled
  - HCP for IID/SDCWA Transfer settled
  - Colorado River Quantification settled

## **Reasoning**

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- TMDL adoption purportedly would result in:
  1. Restricted alternatives/mitigation for Sea restoration
  2. Implementation of unneeded/ineffective BMPs
  3. Accelerated loss of fresh inflows into Sea
  4. Conflicts with the provisions of an effective HCP
  5. Loss of habitat and/or take of endangered species without take permit
  6. Legal challenges from conflicting environmental documents



## Item 1: Salton Sea Project

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**TMDL  
Restricts  
Alternatives?**

## Item 1: Salton Sea Project

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- Salton Sea January 2000 EIS/EIR
  - No preferred alternative
  - Fatal flaws
- Project status unclear
- Authority, USBR, Board working together
  - Board letter to USBR/SSA clarifying TMDL role
  - Letter from Authority to Board
- TMDL is about pesticide-laden dirt

## Item 1: Salton Sea Project

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## Item 2: BMPs

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**TMDL  
Results in  
Ineffective  
BMPs?**

## Item 2: BMPs

- Farmers responsible for choosing proper BMPs
- BMP efficiency well documented
  - Plenty of BMPs to choose from
- Listed BMPs were recommended by farmers and experts, sanctioned by ICFB and TAC

## Item 2: BMPs

Isn't this a  
true problem?



Isn't keeping dirt on the fields just good housekeeping anyway?

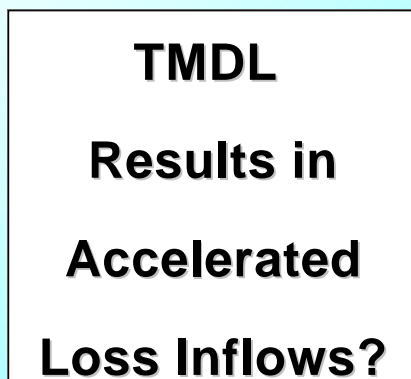
## Item 2: BMPs

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## Item 3: Sea Inflows

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## Item 3: Sea Inflows

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- TMDL is about keeping dirt on fields
  - Not about water quantity
- Economics do not support “inflow” concern
  - Most of water-saving BMPs are the least affordable BMPs
  - The more affordable BMPs result in negligible losses
  - IID/SDCWA Transfer by implementing “extra-ordinary measures”

## Item 3: Sea Inflows

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## Items 4 & 5: TMDLs and HCP

	TMDLs	HCPs
Scope	Specific waterbody	Habitat of listed species
Overall goal	WQS Attainment	No reduction in survival or recovery
Standards	Load allocations	Properly Functioning Condition Criteria*

\* Review criteria for approving HCPs

## TMDLs and HCP (cont.)

Silt TMDL	Transfer HCP
Characterize pollution	No reduction in survival/recovery
Address impaired uses <ul style="list-style-type: none"> <li>• Wildlife habitat</li> <li>• Warmwater fishery</li> <li>• REC I and II</li> <li>• Rare and endangered species</li> </ul>	Address habitat of listed species

## TMDLs and HCP (cont.)

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**TMDL  
Interferes  
with HCP?  
Take Permit?**

## TMDLs and HCP (cont.)

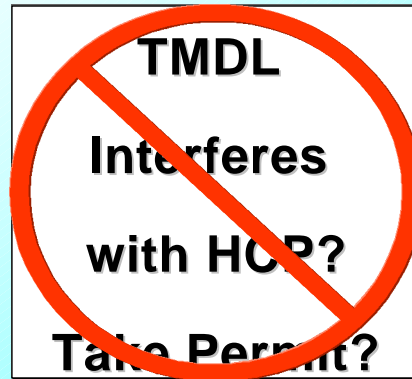
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- TMDL and HCP not mutually exclusive
  - As water quality goes so goes the habitat
- TMDL should precede HCP

Besides, what does keeping dirt on the fields  
have to do the HCP?  
(particularly pesticide-laden dirt)

## TMDLs and HCP (cont.)

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## Item 6: CEQA/NEPA Concerns

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**Legal  
Challenges  
On Conflicting  
CEQA/NEPA  
Documents?**



## CEQA Requirements\*

- Basin Planning is certified regulatory program
  - Exempt from preparing IS, EIR, NDs
- No project level analysis required
- No cumulative impact analysis required
  - Need to look for in some way, assessed cumulative effects
  - Give sufficient consideration to such effects

\* 14 CCR §15250-15253 (CEQA Guidelines)

## CEQA Requirements (cont.)

- Still needs to avoid impacts where feasible
- Need CEQA checklist or other documentation
- Need to comply with CEQA rule requirement\*\*
  - Analysis of reasonably foreseeable
    - Impacts of methods of compliance
    - Mitigation measures for impacts
    - Alternative means of compliance with rule/regulation
  - Rule requirement not to be used to delay adoption

\*\* CEQA Guidelines §15187

## Cumulative Effects

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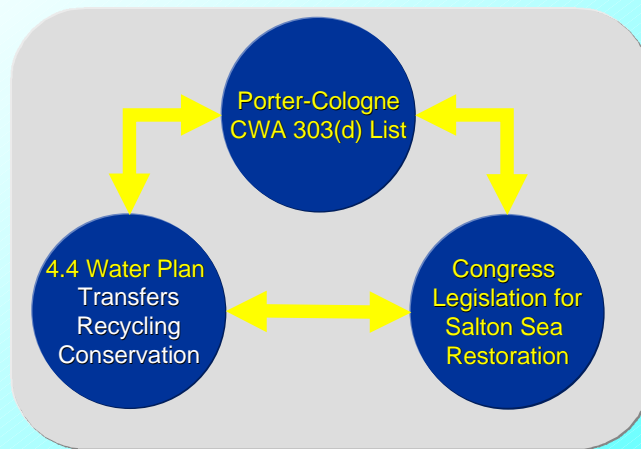
- Salton Sea Project
  - Status unclear
  - Authority, USBR, Board working together
  - TMDL is about dirt quantity/quality
- IID/SDCWA Transfer
  - Not available for public review and comment yet
  - TMDL is about dirt quantity/quality
- Quantification Issues
  - TMDL is about dirt quantity/quality

## Summary

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- CWA, CWC cannot be contingent on projects
- Water quality laws are not subservient to ESA
  - TMDL and HCP process are complementary
- TMDL efforts compliment Sea alternatives
- BMPs are readily available to address problem
  - Effort focuses on keeping “dirty dirt” on fields
- To transfer or not to transfer?

## Coordinated Effort



**Questions/Comments?**